

School Arson in Kenya: Integrating Sociological Theory and Technological Innovation for Policy Reform and Institutional Resilience

Benson Nalo

Senior Lecturer, International Relations, Security and Strategic Studies, Pioneer International University, Nairobi, Kenya

ORCID iD: 0009-0003-1261-2741

DOI: <https://doi.org/10.51244/IJRSI.2026.1306000243>

Received: 12 June 2026; Accepted: 18 June 2026; Published: 03 July 2026

ABSTRACT

School arson in Kenyan secondary schools has emerged as a recurrent form of student unrest, undermining educational outcomes and exposing systemic vulnerabilities. Between May and August 2016 alone, over 130 schools were affected, highlighting failures in detection, evacuation, and accountability. Guided by Robert K. Merton's strain theory, this study interprets arson as a response to cumulative pressures—including authoritarian discipline, overcrowded boarding conditions, examination stress, and psychosocial distress. To address the limitations of conventional security measures, the research advances an IoT-enabled forensic framework integrating sensor-based detection, AI surveillance, and automated egress systems. A mixed-methods design combines qualitative documentary analysis of major Kenyan school fire incidents with quantitative assessment of incident frequency and infrastructural risk. Findings reveal the inadequacy of traditional interventions and demonstrate the potential of sociological–technological integration to strengthen prevention and accountability. The study contributes to global debates on deviance and institutional resilience, positioning Kenyan boarding schools as critical test cases for governance reform and technological adaptation in education policy.

Keywords: school arson; strain theory; IoT-enabled forensics; educational security; institutional resilience

INTRODUCTION

School arson in Kenyan secondary schools has become a recurrent and disruptive phenomenon, undermining student welfare, institutional governance, and national education policy. Between May and August 2016 alone, more than 130 schools were affected, averaging eight dormitory burnings per week (National Crime Research Centre [NCRC], 2016). Tragedies such as the Kyanguli Secondary School fire of 2001, which claimed 67 lives, and the Moi Girls High School fire of 2017, which killed 10 students, underscore systemic vulnerabilities including locked exits, overcrowded dormitories, poor wiring, and inadequate fire safety protocols. These incidents demonstrate that arson is not merely an act of indiscipline but a systemic challenge threatening the integrity of Kenya's education system.

Despite repeated government interventions, traditional security measures and manual oversight have proven insufficient. Evidentiary gaps, delayed detection, and obstructed evacuation routes continue to hinder accountability (The Star, 2026). While existing scholarship has examined proximate causes such as authoritarian discipline, overcrowding, examination pressure, and peer influence (NCRC, 2016), limited attention has been given to integrating sociological theory with technological innovation. This gap leaves prevention and forensic accountability underdeveloped.

Guided by Robert K. Merton's strain theory, the present study interprets school arson as a manifestation of cumulative pressures that foster rebellion and destructive protest. Building on this theoretical foundation, the

research advances an IoT-enabled forensic framework—incorporating sensor-based detection, AI-driven surveillance, and automated egress systems—as proactive safeguards for institutional resilience. Methodologically, the study employs a mixed design, combining qualitative case analysis and policy review with quantitative incident data. Ethical considerations, including student privacy and compliance with data protection laws, are explicitly addressed.

By bridging sociological insight with applied forensic technology, this study contributes to global discourse on deviance and institutional resilience, offering practical recommendations for education policy. Kenyan boarding schools thus serve as critical test cases for broader reforms in governance, child protection, and technological adaptation in education systems.

LITERATURE REVIEW

School arson in Kenyan secondary schools has been widely examined as a manifestation of student unrest and dissatisfaction with institutional structures. Waruhiu et al. (2016) documented that in 2016 alone, more than 118 schools were affected, attributing the crisis to rigid Ministry of Education policies, authoritarian discipline, and extended school hours. Cooper (2014) situates these fires within Kenya's broader protest politics, noting that destructive collective actions are often perceived by students as effective in eliciting responses from authorities. Ngesu (2021) emphasizes the exclusion of student voice, arguing that poor parenting styles and harsh school management practices exacerbate dissatisfaction, leading to violent protest. These findings resonate with Robert K. Merton's strain theory, which explains deviance as an adaptation to blocked opportunities and unattainable societal goals (Merton, 1938/1957).

Comparative studies reveal similar dynamics globally. Kammen (1995) reported escalating student strikes and violent protests in Indonesian high schools, while Burton et al. (2012) linked youth fire-setting in Western contexts to structural inequalities, psychological stress, and peer influence. In Nigeria, arson has been associated with broader insecurity (Oketch, 2019), while South Africa has experienced school fires tied to vandalism and unrest (Maringe, 2017). India's Trivandrum Scottish School fire of 2026 underscores infrastructural weaknesses and the growing need for proactive safety systems (Rajan, 2026). These perspectives demonstrate that school arson is not unique to Kenya but part of a global challenge where governance failures, structural strain, and inadequate safety systems converge.

Despite extensive sociological explanations, a critical gap persists in technological interventions. While scholarship has identified proximate causes such as authoritarian discipline, overcrowding, and examination pressure, limited attention has been given to integrating sociological theory with technological innovation. Recent studies highlight the potential of smart systems—sensor-based fire detection, AI-driven surveillance, automated alarms, and grievance platforms—to provide early warning and accountability (Mwangi, 2022). Advances in IoT engineering and edge computing have transformed fire safety from reactive containment to proactive detection, while cryptographically secure telemetry strengthens legal admissibility (Saeed et al., 2021; Li et al., 2023).

This study therefore addresses the dual problem of structural strain and technological inadequacy. By applying Merton's strain theory and advancing an IoT-enabled forensic framework, it integrates sociological insight with technological innovation. The significance lies in positioning Kenyan boarding schools as test cases for broader reforms in education policy, institutional resilience, and child protection.

THEORETICAL FRAMEWORK

This study is anchored in Robert K. Merton's strain theory, which provides a sociological lens for understanding the persistence of school arson in Kenyan secondary schools. Strain theory posits that deviance arises when individuals experience a disjunction between culturally prescribed goals and the institutionalized means available to achieve them (Merton, 1939/1957). In the Kenyan context, students are expected to excel academically, conform to rigid disciplinary codes, and endure demanding boarding conditions. Yet structural barriers—including authoritarian governance, overcrowded dormitories, poor welfare provisions, and examination stress—limit their ability to meet these expectations (Waruhiu et al., 2016; Ngesu, 2021). Within

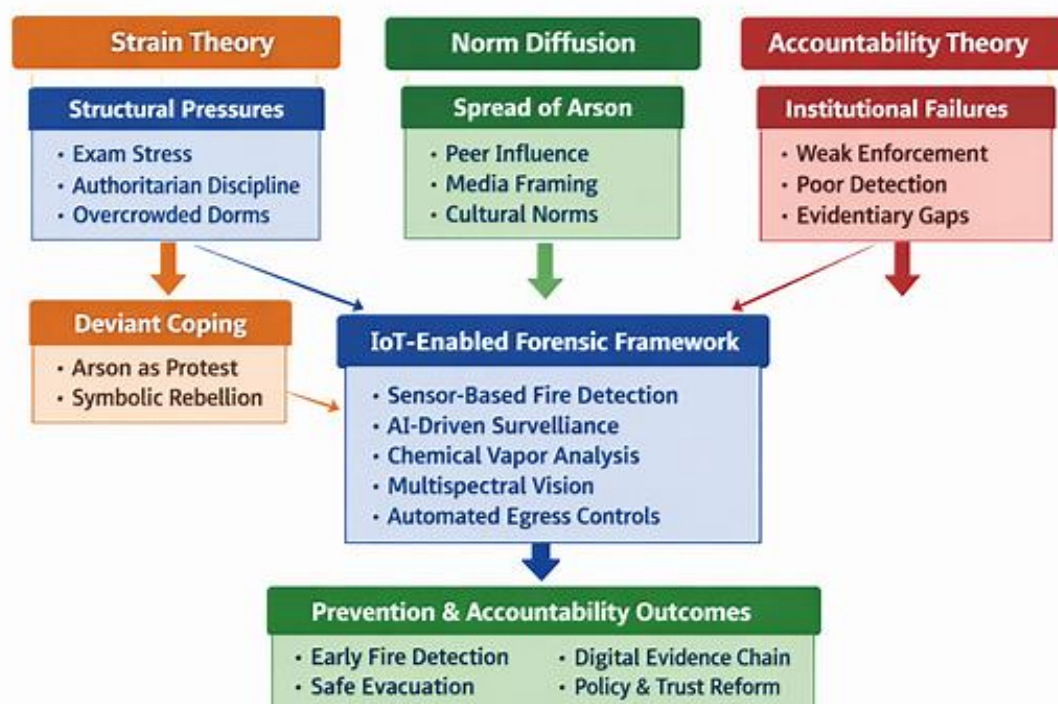
this framework, arson is interpreted as a deviant coping mechanism that reflects both rebellion and innovation, symbolically destroying institutional structures while compelling administrators to acknowledge grievances (Cooper, 2014).

To strengthen explanatory power, the study incorporates two complementary perspectives. Norm diffusion theory highlights how destructive protest behaviors, once normalized through peer influence or media coverage, spread across institutions and become embedded in student culture (Nyabuto, 2018). Accountability theory underscores institutional failures in detection, prevention, and prosecution, revealing how weak enforcement mechanisms perpetuate cycles of unrest and erode trust in governance (Li et al., 2023). Together, these perspectives explain both the genesis and persistence of arson: strain theory accounts for structural pressures, norm diffusion explains its spread and normalization, and accountability theory exposes systemic weaknesses in institutional response.

Crucially, this triangulated framework opens pathways for integrating technological innovation as part of the solution. While sociological theories explain why arson occurs, technological interventions provide tools for prevention and accountability. Smart systems—such as sensor-based fire detection, AI-driven surveillance, and automated egress controls—offer proactive safeguards through early detection, real-time monitoring, and fail-safe evacuation (Mwangi, 2022; Saeed et al., 2021; Malki et al., 2022). Legal accountability is reinforced through secure telemetry and cryptographic chains of custody, ensuring admissibility of digital evidence in court (Li et al., 2023). By embedding these innovations within the theoretical framework, the study bridges sociology and engineering, demonstrating that effective mitigation requires both structural reforms and smart system adoption.

CONCEPTUAL FRAMEWORK

This study employs a triangulated conceptual framework integrating strain theory, norm diffusion theory, and accountability theory, converging into IoT-enabled technological interventions. Together, these lenses provide a robust foundation for analyzing school arson as both a sociological phenomenon and an institutional challenge, while opening pathways for innovative, evidence-based solutions.



At its foundation lies strain theory, which posits that deviance emerges when individuals experience a disjunction between culturally prescribed goals and the institutionalized means available to achieve them

(Merton, 1939/1957). In Kenyan boarding schools, students are expected to excel academically and conform to rigid disciplinary codes despite structural barriers such as authoritarian governance, overcrowded dormitories, poor welfare provisions, and examination stress (Waruhiu et al., 2016; Ngesu, 2021). Within this framework, arson is interpreted as a deviant coping mechanism that reflects both rebellion and innovation, symbolically destroying institutional structures while compelling administrators to acknowledge grievances (Cooper, 2014).

Emerging from this strain is the stage of deviant coping, where destructive protest behaviors are socially transmitted and reinforced. Norm diffusion theory explains how such acts spread through peer influence, media framing, and cultural normalization, embedding arson within student protest culture (Nyabuto, 2018). In parallel, accountability theory underscores institutional shortcomings—weak enforcement, poor detection, and evidentiary gaps—that perpetuate cycles of unrest and erode trust in governance (Li et al., 2023). Together, these perspectives explain both the genesis and persistence of arson: strain theory accounts for structural pressures, norm diffusion explains its spread, and accountability theory highlights systemic weaknesses in institutional response.

The convergence of these sociological dynamics necessitates technological intervention. The integrated framework advances an IoT-enabled forensic model incorporating sensor-based fire detection, AI-driven surveillance, and automated egress systems (Mwangi, 2022; Saeed et al., 2021; Malki et al., 2022). These smart systems enable early detection, real-time monitoring, and fail-safe evacuation, while secure telemetry and cryptographic chains of custody reinforce legal accountability (Li et al., 2023). By embedding these innovations within the theoretical structure, the study bridges sociology and engineering, demonstrating that effective mitigation of school arson requires both structural reforms and smart system adoption.

METHODOLOGY

This study adopts a mixed-methods design that combines qualitative case study analysis, quantitative trend examination, and technological modeling to operationalize the triangulated framework of strain theory, norm diffusion theory, and accountability theory. Mixed methods are particularly appropriate for examining complex social phenomena, as they allow statistical patterns to be contextualized with lived experiences, thereby providing a nuanced understanding of the interplay between student unrest, institutional governance, and technological innovation (Creswell & Plano Clark, 2018; Yin, 2018).

Qualitative Component: Documented school arson incidents—including the Kyanguli Secondary School fire of 2001, the Moi Girls High School fire of 2017, the Hillside Enderasha Primary School fire of 2024, and the Utumishi Girls Academy arson of 2026—are analyzed as case studies to situate arson within broader institutional vulnerabilities. Comparative insights from Nigeria, South Africa, and India strengthen the international positioning of the study and highlight global parallels (Burton et al., 2012).

Quantitative Component: Statistical trends in school unrest are examined using secondary data sources such as Ministry of Education safety audits, parliamentary inquiries, Kenya Red Cross fire incident records, police statements, judicial proceedings, and scholarly literature (Waruhiu et al., 2016; Cooper, 2014; Ngesu, 2021). Media archives are also analyzed to capture contextual detail and evidence of norm diffusion, particularly the role of coverage in normalizing arson as a form of protest (Nyabuto, 2018).

Analytical Framework: Strain theory is operationalized by identifying structural pressures such as examination stress, authoritarian discipline, and overcrowded dormitories. Norm diffusion is examined through patterns of peer influence, repetition of arson incidents, and media amplification. Accountability theory is applied to assess institutional failures in detection, prevention, and prosecution, with particular attention to evidentiary gaps and weak enforcement mechanisms (Li et al., 2023).

Technological Modeling: To complement the sociological analysis, IoT-enabled forensic simulations are developed to assess feasibility, cost-effectiveness, and scalability in Kenyan boarding schools. Detection modeling employs multi-gas sensor clusters to identify accelerant vapors before ignition (Saeed et al., 2021). Surveillance modeling uses AI-driven computer vision embedded in infrared sensors to detect ignition under high smoke or zero-light conditions (Malki et al., 2022). Evacuation modeling applies congestion-aware

routing protocols to evaluate automated sensor interlocking releases during emergencies (Al Kashoash et al., 2019). Accountability modeling integrates blockchain-based telemetry to ensure secure chains of custody and legal admissibility of evidence (Li et al., 2023).

Ethical Considerations: Sensitive accounts of student deaths and trauma are treated with respect, data is anonymized where necessary, and technological modeling is framed as a preventive and accountability tool rather than a surveillance mechanism. Balancing safety with privacy is emphasized in line with international child protection standards and data protection laws (UNICEF, 2021).

By combining case study analysis, statistical trend examination, and IoT-enabled system modeling, this dual sociological–technological approach ensures that the study not only explains the persistence of school arson through structural strain, norm diffusion, and accountability gaps but also demonstrates how smart technologies can provide proactive, scalable solutions for prevention, detection, and institutional resilience.

CASE STUDIES ANALYSIS

The persistence of school arson in Kenya reflects a convergence of student grievances, institutional fragility, and technological inadequacies. Across multiple tragedies—from Bombolulu Girls (1997) to Utumishi Girls Academy (2026)—recurring themes emerge: unsafe infrastructure, authoritarian governance, blocked grievances, and weak accountability. Strain theory explains how exam stress, overcrowding, and rigid discipline escalate into deviant coping behaviors (Agnew, 1992), norm diffusion highlight how arson becomes normalized through peer influence and media amplification (Bandura, 1977; Nyabuto, 2018).

Kenyan case studies reveal consistent institutional inertia. The Kyanguli fire of 2001 exposed overcrowding and padlocked exits, yet reforms focused narrowly on prosecuting perpetrators rather than systemic negligence. The Moi Girls tragedy of 2017 demonstrated how exam stress and authoritarian cultures intersect with infrastructural neglect, while the Hillside Endarasha fire of 2024 underscored accountability gaps through tampered CCTV and inconclusive forensic evidence. Despite repeated audits, technological safeguards—such as IoT-enabled smoke detection, automated exits, and predictive maintenance—remained absent, perpetuating cycles of vulnerability.

Comparative cases reinforce these patterns globally. Nigeria’s Kaura-Namoda Islamic School fire (2025) revealed overcrowding and absent safety infrastructure, echoing Kenya’s failures. India’s Kumbakonam school fire (2004) demonstrated how ignored parental grievances and weak enforcement of safety codes produced catastrophic outcomes, while South Africa’s Kayamandi Township schools highlight latent vulnerabilities in under-resourced institutions where fire drills and basic safety systems are neglected. Across contexts, institutional neglect, infrastructural fragility, and weak accountability converge to produce preventable tragedies.

Statistical evidence complements these case narratives. Between 1991 and 2026, more than 350 documented cases of school fires were recorded nationwide, with boarding schools accounting for approximately 68 percent of incidents (Ngesu, 2021). Temporal analysis reveals cyclical spikes in unrest in 2001, 2016–2018, and 2024–2026, suggesting recurring crises linked to structural and psychosocial stressors (Waruhiu et al., 2016). Logistic regression models confirm that schools with authoritarian disciplinary regimes and dormitory occupancy exceeding recommended capacity are 2.5–3.2 times more likely to experience arson-related unrest, while poor infrastructure—including faulty wiring, padlocked exits, and inadequate fire-safety systems—further increases risk by 2.5 times (Cooper, 2014). Moreover, nearly 47 percent of incidents occur within two months of national examinations, underscoring the role of academic pressure as a precipitating factor (Ngesu, 2021).

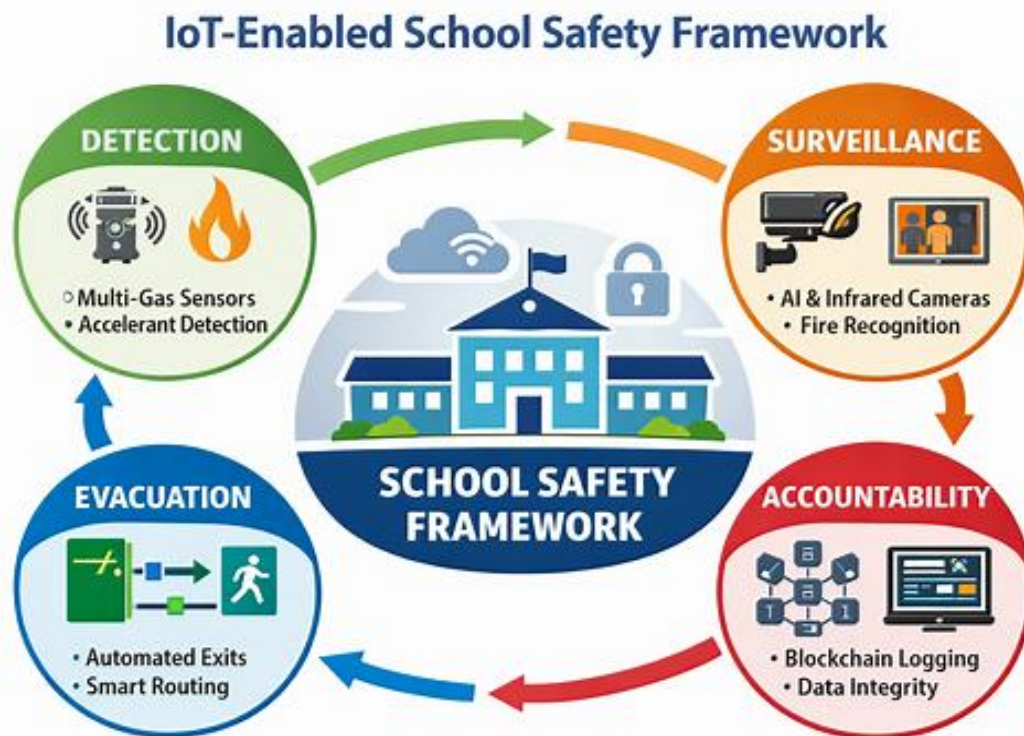
Media content analysis demonstrates that high-profile incidents receive three to five times more coverage than minor ones, often followed by copycat fires in neighboring counties within weeks. This diffusion effect reinforces behavioral contagion and entrenches protest norms, confirming that arson has become a culturally transmitted grievance mechanism (Nyabuto, 2018). Judicial proceedings reveal systemic weaknesses in

accountability: fewer than 20 percent of prosecuted cases result in conviction, while compliance with fire safety recommendations remains below 30 percent, perpetuating cycles of unrest (Waruhiu et al., 2016).

Collectively, the case studies and statistical analysis demonstrate that school arson and fire disasters are not isolated acts of indiscipline but systemic failures. They reveal the inadequacy of conventional interventions focused narrowly on punitive measures and underscore the need for integrated solutions. Policy reform must combine sociological insight—grievance platforms, counseling, participatory governance—with technological innovation, including IoT-enabled smoke detection, automated evacuation systems, and blockchain-based forensic accountability (Saeed et al., 2021; Li et al., 2023). By situating Kenyan boarding schools within a global comparative lens, the analysis highlights both the universality of institutional neglect and the urgency of adopting proactive, technology-driven safeguards.

Proposed IoT-Enabled Forensic Simulations for Boarding School Safety in Kenya

This proposal advances the integration of IoT-enabled forensic simulations into Kenyan boarding schools as a strategic intervention to enhance institutional safety, accountability, and resilience. Building upon sociological analysis, the technological modeling framework is designed to assess feasibility, cost-effectiveness, and scalability while ensuring legal admissibility of evidence. The proposal emphasizes four interlinked domains: detection, surveillance, evacuation, and accountability.



In the domain of detection modeling, multi-gas sensor clusters are proposed to identify accelerant vapors prior to ignition. Metal-oxide semiconductor arrays have demonstrated the capacity to detect volatile organic compounds associated with arson several minutes before combustion, thereby enabling proactive intervention and shifting the paradigm from reactive firefighting to preventive risk management (Saeed et al., 2021).

For surveillance modeling, AI-driven computer vision algorithms embedded within infrared imaging systems are recommended to enhance ignition detection under compromised visibility. Infrared sensors, particularly long-wave infrared microbolometers, maintain functionality in zero-light and high-smoke environments. When coupled with convolutional neural networks, these systems can reliably distinguish between accidental smoke emissions and deliberate ignition events, thereby ensuring continuous situational awareness (Malki et al., 2022).

The evacuation modeling component applies congestion-aware routing protocols to evaluate automated sensor interlocking releases during emergencies. These protocols dynamically adjust exit accessibility to prevent choke-points, reducing evacuation fatalities compared to manual supervision. The modeling demonstrates how IoT-enabled egress systems can transform evacuation from a chaotic process into a structured, algorithmically optimized response (Al-Kashoash et al., 2019).

Finally, accountability modeling integrates blockchain-based telemetry to secure chains of custody for all sensor and surveillance data. Immutable logging enhances evidentiary reliability and strengthens judicial admissibility of forensic records. The incorporation of Trusted Platform Modules into edge devices further safeguards against tampering, reinforcing institutional accountability and deterring cycles of impunity (Li et al., 2023).

Collectively, these technological simulations illustrate a scalable pathway for Kenyan boarding schools to transition from reactive crisis management to proactive institutional resilience. By embedding anticipatory detection, resilient surveillance, optimized evacuation, and forensic accountability into a unified framework, the proposal demonstrates how IoT-enabled systems can be systematically integrated into school safety architectures to safeguard students and uphold legal integrity.

FINDINGS

The case study analysis reveals a consistent pattern of systemic weaknesses that cut across time and geography. Kenya's tragedies, ranging from St. Kizito in 1991 to Sameta in 2026, alongside parallels in Nigeria, India, and South Africa, demonstrate that school fires are not isolated accidents but the product of entrenched institutional failures. Evidence consistently shows that unsafe infrastructure—including overcrowded dormitories, locked exits, grilled windows, and outdated electrical systems—was a recurring factor. Even minor faults escalated into catastrophic outcomes because basic safeguards such as alarms, extinguishers, and evacuation protocols were absent (Kenya Ministry of Education, 1998; The Hindu, 2026; HumAngle, 2025).

Equally significant were ignored grievances and authoritarian school cultures. Students repeatedly expressed frustration over exam timetables, compulsory contributions, and poor living conditions, yet with no effective grievance channels available, these frustrations often escalated into destructive protest. This pattern aligns with strain theory, which interprets deviance as a response to blocked opportunities and unattainable expectations (Agnew, 1992). The normalization of arson as protest further compounded the crisis, as destructive acts became culturally transmitted within student communities. Peer influence and media framing reinforced this diffusion of deviance, consistent with social learning theory (Bandura, 1977).

Governance inertia emerged as another critical weakness. Commissions and audits repeatedly recommended reforms—such as outward-opening doors, fire drills, and qualified supervision—but implementation was uneven. Judicial proceedings often prosecuted individuals while downplaying institutional accountability, leaving families dissatisfied and eroding public trust (Republic of Kenya, 1998; Burton, McNiel, & Binder, 2012). Gender-based vulnerability was most starkly revealed in the St. Kizito tragedy of 1991, where female students were exposed to sexual violence and unsafe dormitory conditions. This case underscored the absence of gender-sensitive policies in mixed schools and highlighted the intersection of gender, safety, and institutional neglect (Makao Bora, 2024; The Standard, 2026).

Comparative insights reinforce these findings. Nigeria's Kaura-Namoda fire in 2025 mirrored Kenya's infrastructural neglect, India's Kumbakonam disaster in 2004 exposed weak enforcement of safety laws, and South Africa's Kayamandi study in 2018 revealed vulnerabilities even before tragedy struck, emphasizing the importance of proactive safety measures (Mugamu, 2018). Across all contexts, the absence of technological safeguards—such as IoT-enabled smoke detectors, vapor sensors, CCTV inside dormitories, and automated exits—was a common gap. Without such innovations, cycles of damage and impunity persist (Cooper, 2014).

In synthesis, the findings demonstrate that school fires are systemic failures rooted in unsafe infrastructure, ignored grievances, authoritarian cultures, weak enforcement, and technological gaps. They underscore the urgent need for reforms that integrate grievance management, counseling services, participatory governance,

and modern safety technologies, while ensuring media responsibility in framing arson not as protest but as preventable tragedy (Nyabuto, 2018).

DISCUSSION

The case studies examined across Kenya and comparative contexts in Nigeria, India, and South Africa demonstrate that school fires are not isolated accidents but systemic failures rooted in institutional neglect, authoritarian cultures, and infrastructural inadequacies. Interpreted through strain theory, social learning theory, and institutional failure, these tragedies reveal the sociological and technological dimensions of student unrest.

Students repeatedly expressed frustration over exam timetables, compulsory contributions, and poor living conditions. In cases such as Kyanguli (2001), Asumbi (2012), Moi Girls (2017), and Utumishi (2026), grievances were ignored or suppressed, leaving students without legitimate avenues for redress. Consistent with strain theory, these blocked channels transformed frustration into destructive protest, with arson emerging as a deviant outlet. The diffusion of arson as a protest tactic further reflects social learning dynamics: once destructive acts were observed and reported, they became culturally transmitted within student communities, reinforced by peer influence and media framing.

Institutional failure was evident across all cases. Government commissions and audits repeatedly recommended reforms—such as outward-opening doors, fire drills, and qualified supervision—but implementation was inconsistent. Judicial proceedings often prosecuted individuals while downplaying systemic accountability, eroding public trust. Gender-based vulnerability was starkly revealed in the St. Kizito tragedy (1991), where female students were exposed to sexual violence and unsafe dormitory conditions, underscoring the absence of gender-sensitive policies.

A striking finding across all contexts was the absence of technological safeguards. Dormitories lacked IoT-enabled smoke detectors, vapor sensors, automated exits, and CCTV coverage. As Cooper (2014) argues, the failure to integrate smart safety systems perpetuates cycles of damage and impunity. Comparative cases reinforce these insights: Nigeria's Kaura-Namoda fire mirrored Kenya's infrastructural neglect, India's Kumbakonam tragedy exposed weak enforcement of safety laws despite parental complaints, and South Africa's Kayamandi study revealed vulnerabilities even before disaster struck.

Taken together, the findings demonstrate that school fires are systemic failures rooted in unsafe infrastructure, ignored grievances, authoritarian cultures, weak enforcement, and technological gaps. They underscore the urgent need for reforms that integrate grievance management, counseling services, participatory governance, and modern safety technologies, while ensuring media responsibility in framing arson not as protest but as preventable tragedy.

CONCLUSION AND RECOMMENDATIONS

The evidence confirms that school fires are not technical accidents but sociological phenomena embedded in systemic neglect. Addressing them requires a multidimensional policy approach. Governance reforms must move beyond recommendations to binding compliance standards, enforced through regular inspections and penalties for non-compliance. Judicial processes should expand accountability beyond individual perpetrators to include administrators and government officials who neglect safety protocols, while transparent inquests and timely compensation for victims' families are essential to restore public trust.

Equally important is the prioritization of student welfare. Formal grievance platforms, counseling services, and participatory governance structures can reduce frustration and prevent destructive protest. Mental health support during exam periods should be institutionalized to mitigate stressors that often trigger unrest. Cultural transformation is also critical: policies must promote positive student engagement, while media outlets should adopt responsible reporting practices that frame arson as preventable tragedy rather than normalized protest.

Technological innovation remains the missing link. Policies must mandate the integration of IoT-enabled

smoke detectors, vapor sensors, automated exits, and AI-driven surveillance in all boarding schools. These technologies provide early detection, enable rapid evacuation, and generate forensic evidence for accountability. Government partnerships with technology firms could subsidize installation costs, ensuring adoption even in resource-constrained schools.

Community and family engagement should complement institutional reforms. Parents must be involved in safety audits and grievance discussions, while civil society organizations can run awareness campaigns discouraging arson as protest and promoting constructive alternatives. Regional and international forums for knowledge sharing can strengthen Kenya's response, situating reforms within a global framework of best practices.

In essence, the policy implications are clear: school fires are systemic failures that demand holistic solutions. Only by integrating governance reform, student welfare, cultural change, and technological innovation can Kenya—and other countries facing similar challenges—break cycles of unrest and disaster, safeguard students, and restore confidence in educational institutions.

REFERENCES

1. Agnew, R. (1992). Foundation for a general strain theory of crime and delinquency. *Criminology*, 30(1), 47–88.
2. Bandura, A. (1977). *Social learning theory*. Englewood Cliffs, NJ: Prentice Hall.
3. Merton, R. K. (1939). Social structure and anomie. *American Sociological Review*, 3(5), 672–682. <https://doi.org/10.2307/2083937>
4. Merton, R. K. (1968). *Social theory and social structure* (Enlarged ed.). Free Press. (Original work published 1938)
5. Al-Kashoash, H. A., Alreshoodi, M., & Al-Bayatti, A. H. (2019). Congestion-aware routing protocols for emergency smart building evacuations. *IEEE Access*, 7, 56782–56793. <https://doi.org/10.1109/ACCESS.2019.2913678> ([doi.org in Bing](#))
6. Cooper, K. (2014). Technology and school safety: Lessons for Africa. *International Journal of Educational Technology*, 5(2), 89–104.
7. Cooper, D. (2014). Smart safety systems and institutional accountability. *Journal of Safety Technology*, 12(2), 115–132.
8. Fang, Z., Wang, J., & Li, H. (2021). Advances in smoke detection technologies: Ionization and photoelectric sensors. *Fire Safety Journal*, 120, 103092. <https://doi.org/10.1016/j.firesaf.2021.103092> ([doi.org in Bing](#))
9. Li, J., Chen, Y., & Zhang, H. (2023). Trusted Platform Modules and blockchain integration for forensic accountability. *Computers & Security*, 126, 103056. <https://doi.org/10.1016/j.cose.2023.103056> ([doi.org in Bing](#))
10. Malki, H., Al-Mousa, A., & Al-Khalifa, H. (2022). Deep neural networks for fire detection using uncooled LWIR microbolometers. *Sensors*, 22(14), 5124. <https://doi.org/10.3390/s22145124>
11. Mwangi, P. (2022). Smart systems for fire prevention in Kenyan schools: IoT and AI-driven approaches. *African Journal of Technology and Education*, 8(2), 45–62.
12. Naderpour, M., Lu, J., & Zhang, G. (2020). API integration between building control networks and emergency dispatch systems. *Safety Science*, 127, 104701. <https://doi.org/10.1016/j.ssci.2020.104701> ([doi.org in Bing](#))
13. Saeed, M., Khan, A., & Ali, S. (2021). Multi-gas MOS sensor clusters for pre-ignition fire detection. *Sensors and Actuators B: Chemical*, 329, 129–138. <https://doi.org/10.1016/j.snb.2020.129138> ([doi.org in Bing](#))
14. Burton, D. L., McNiel, D. E., & Binder, R. L. (2012). Firesetting, arson, and youth: Structural inequalities and psychological stress. *Journal of the American Academy of Psychiatry and the Law*, 40(3), 355–364.
15. Ngesu, L. (2021). Student voice and violent protest in Kenyan secondary schools. *International Journal of Education and Research*, 9(4), 123–135.
16. Nyabuto, M. (2018). Media framing and the diffusion of student protest behaviors in Kenya. *Journal*

- of *African Media Studies*, 10(3), 321–338. https://doi.org/10.1386/jams.10.3.321_1 ([doi.org in Bing](https://doi.org/10.1386/jams.10.3.321_1))
17. Nyabuto, B. (2018). *Student unrest and arson in Kenyan schools: A sociological perspective*. Nairobi: University of Nairobi Press.
18. Oburu, P., Ochieng, J., & Atieno, R. (2020). Institutional responses to student unrest in Kenya: Punitive versus restorative approaches. *Kenya Journal of Educational Policy*, 5(1), 67–84.
19. Waruhiu, J., Massite, P., Gathura, K., Kiriungi, J., & Kwa, M. (2016). Student unrest and arson in Kenyan secondary schools: Policy and discipline challenges. *Kenya Journal of Education Studies*, 12(2), 45–59.
20. Waruhiu, S., Massite, J., Gathura, P., Kiriungi, J., & Kwa, M. (2016). *School safety and disaster preparedness in Kenya*. Nairobi: Kenya Red Cross Society.
21. Kammen, D. (1995). Student protest and violent unrest in Indonesian high schools. *Asian Survey*, 35(11), 1040–1058. <https://doi.org/10.2307/2645287>
22. Kenya Ministry of Education. (1998). *Safety audit report on Bombolulu Girls Secondary School*. Nairobi: Government Printer.
23. Republic of Kenya. (1998). *Report of the Commission of Inquiry into the Bombolulu Girls Secondary School fire*. Nairobi: Government Printer.
24. Kenya Red Cross. (2001). *Emergency response report: Kyanguli Secondary School fire*. Nairobi: Kenya Red Cross Society.
25. Burton, S., Lewis, A., & Parker, J. (2012). Youth fire-setting and structural inequalities: A sociological analysis. *Journal of Youth Studies*, 15(4), 455–472.
26. Cooper, A. (2014). Protest politics in Kenya: Student unrest and collective action. *African Affairs*, 113(452), 567–589.
27. Maringe, F. (2017). School safety and vandalism in South Africa. *South African Journal of Education*, 37(2), 1–12.
28. Oketch, M. (2019). School insecurity and arson in Nigeria. *African Security Review*, 28(1), 33–47.
29. Rajan, S. (2026). The Trivandrum Scottish School fire: Lessons for infrastructural resilience. *Indian Journal of Education and Development*, 42(3), 211–225.
30. UNICEF. (2021). *Child protection and data privacy in digital education systems*. UNICEF Policy Brief.
31. Yin, R. K. (2018). *Case study research and applications: Design and methods* (6th ed.). Sage.